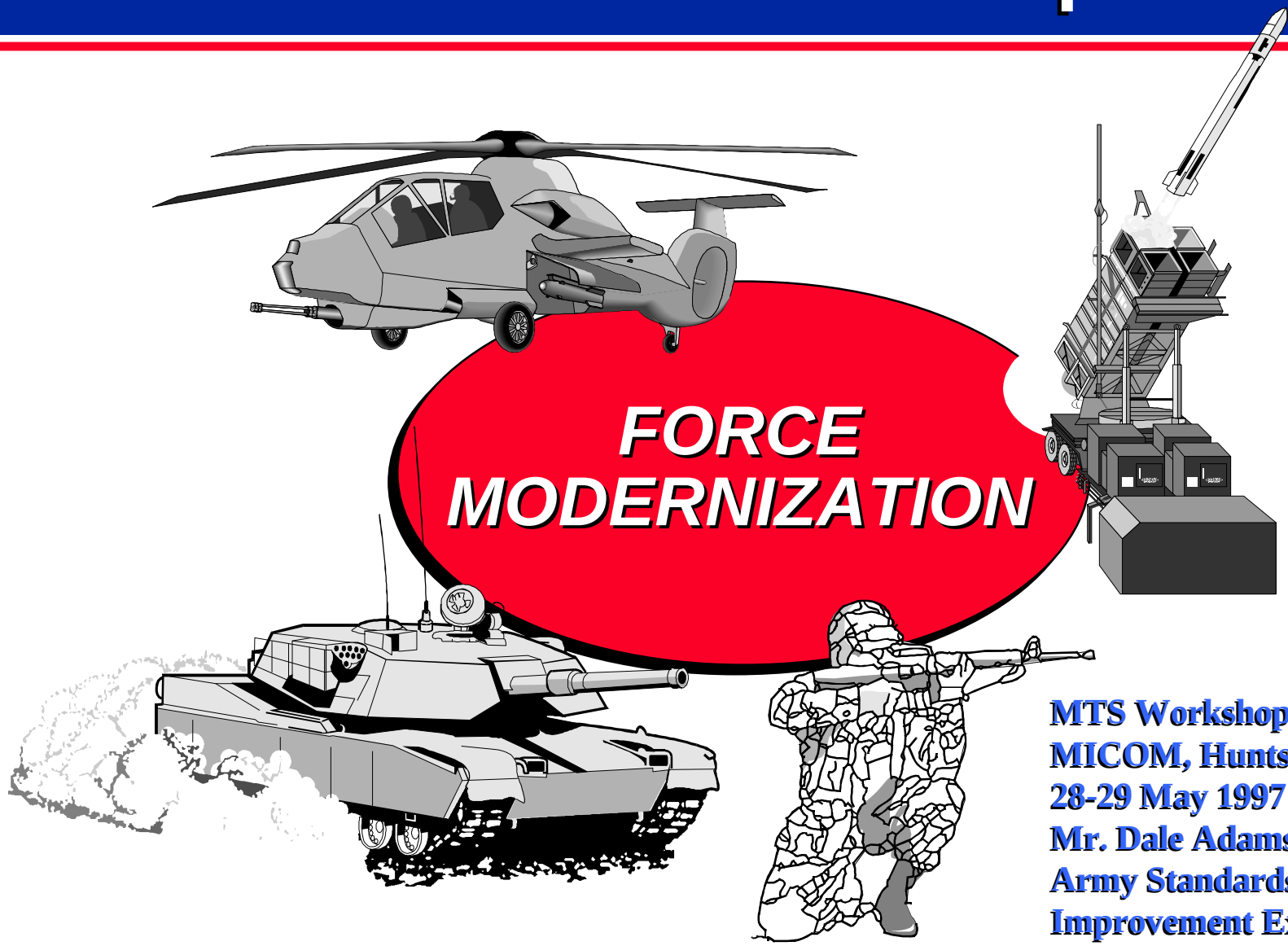
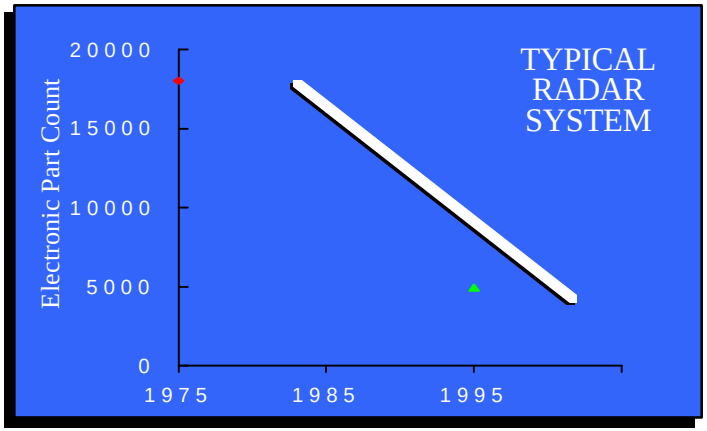
Modernization Thru Spares



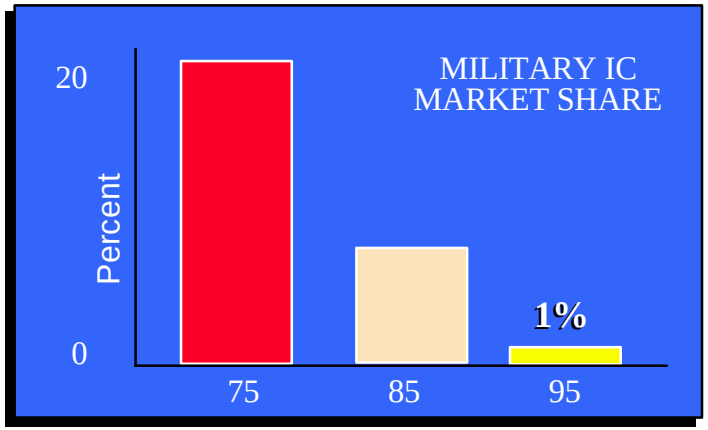
MTS Workshop
MICOM, Huntsville, AL
28-29 May 1997
Mr. Dale Adams
Army Standards
Improvement Executive

Technology Revolution

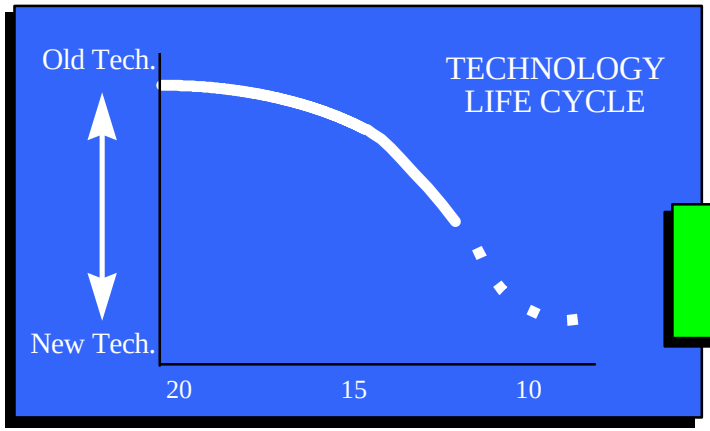
Reduction in Electronic Parts

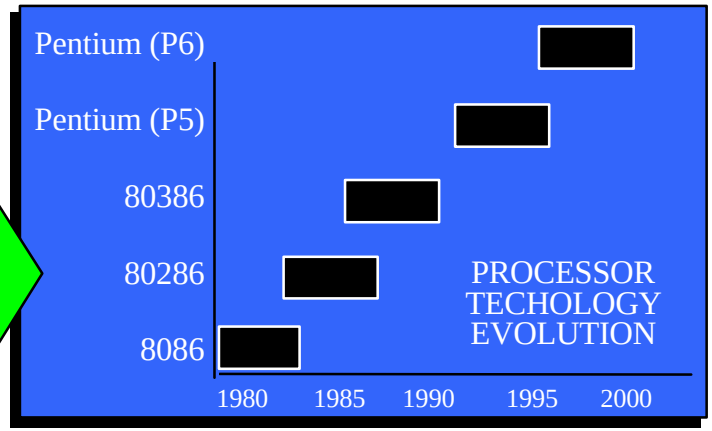


Military Market Share Decreasing



New Technology Replacing Old Technology Faster





Obsolete Technology

Impacts

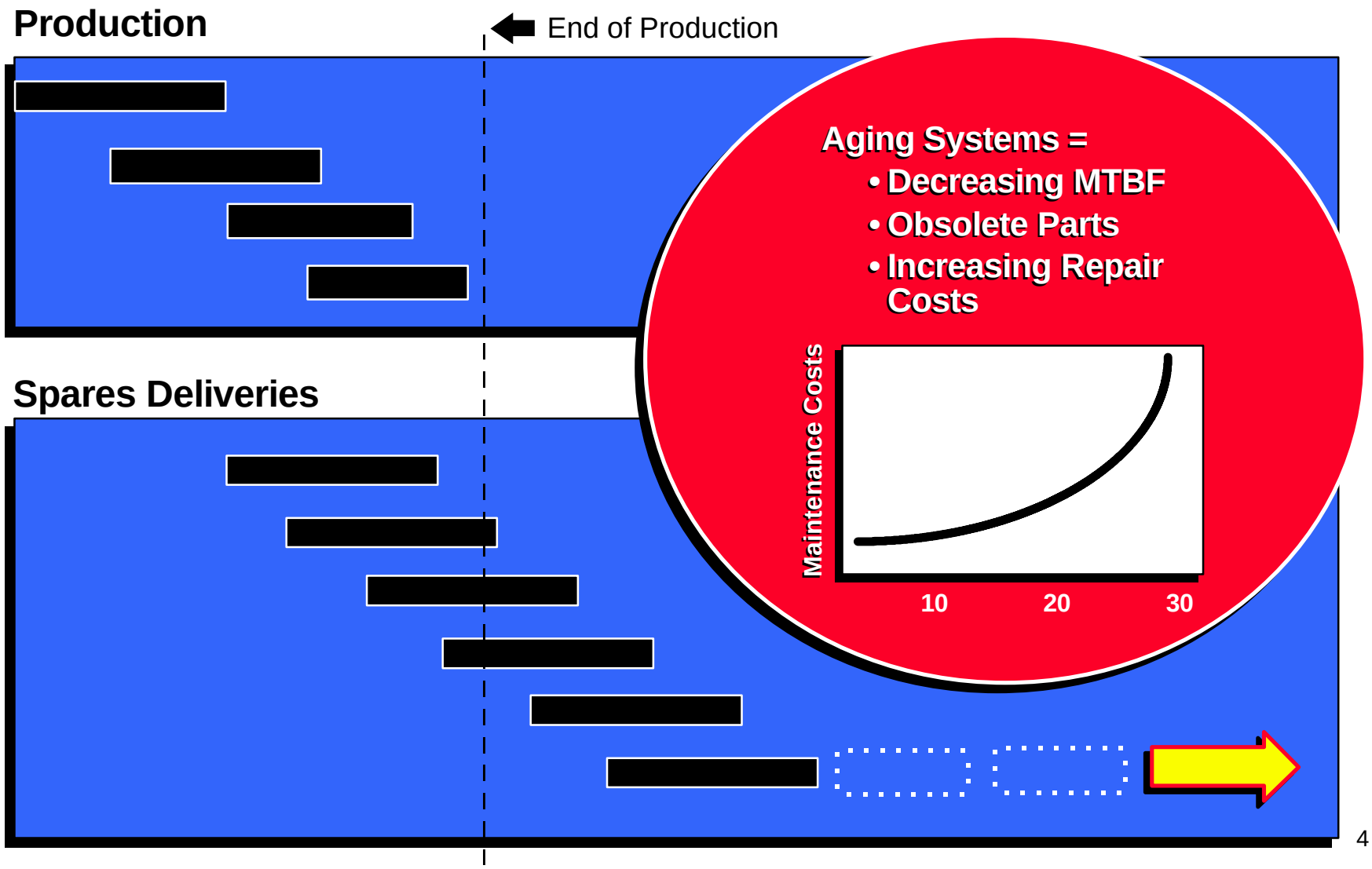
- Redesign in EMD
- Configuration Management
- Parts Obsolesence

Solutions

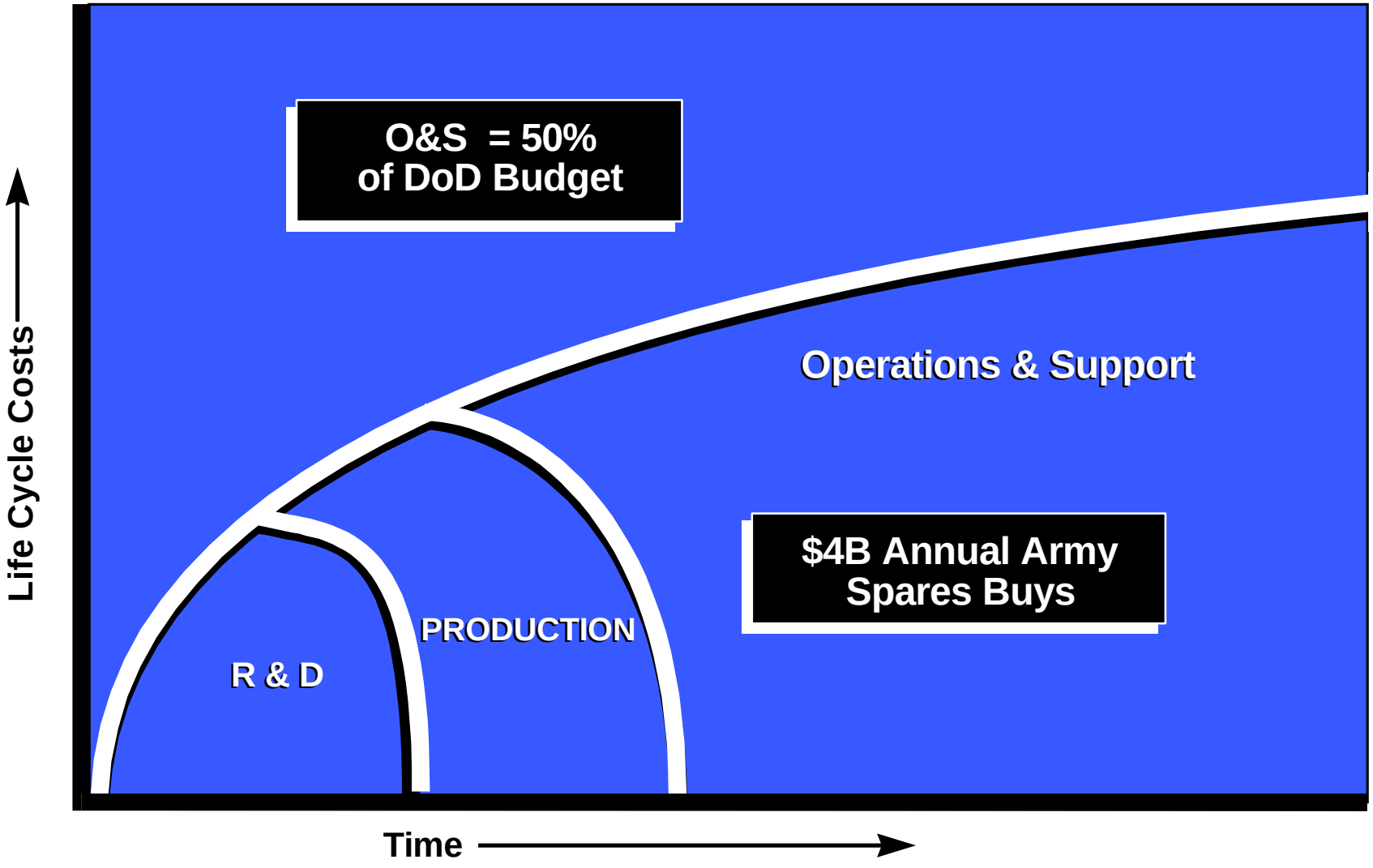
- "Open System" Design
- Contractor Retains Configuration Control Responsibility
- Production
- Spares/ Replen-ishment

  - Contractor Retains Design Authority
  - Performance-Based Specification

Typical Program Evolution

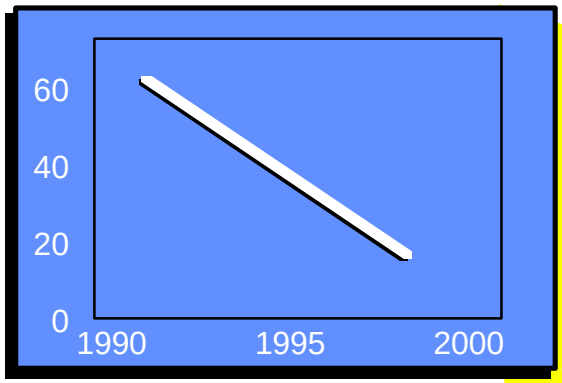


MTS Leverages Portion of O&S Costs

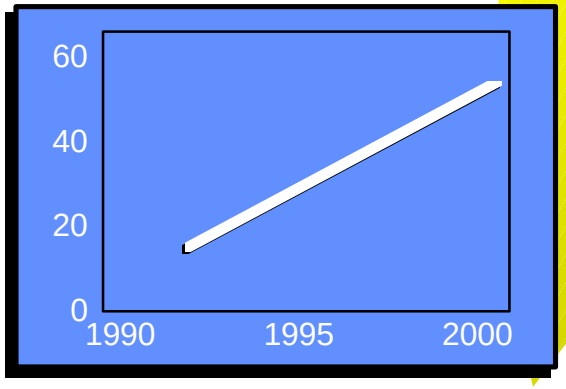


The Modernization Challenge

Declining New Start Programs



Aging Weapon Systems



Force XXI

Superior Equipment

Advanced Tactics

Force Modernization

The Opportunity

Industry Proposals

- **New Designs**
- **Common Processes**

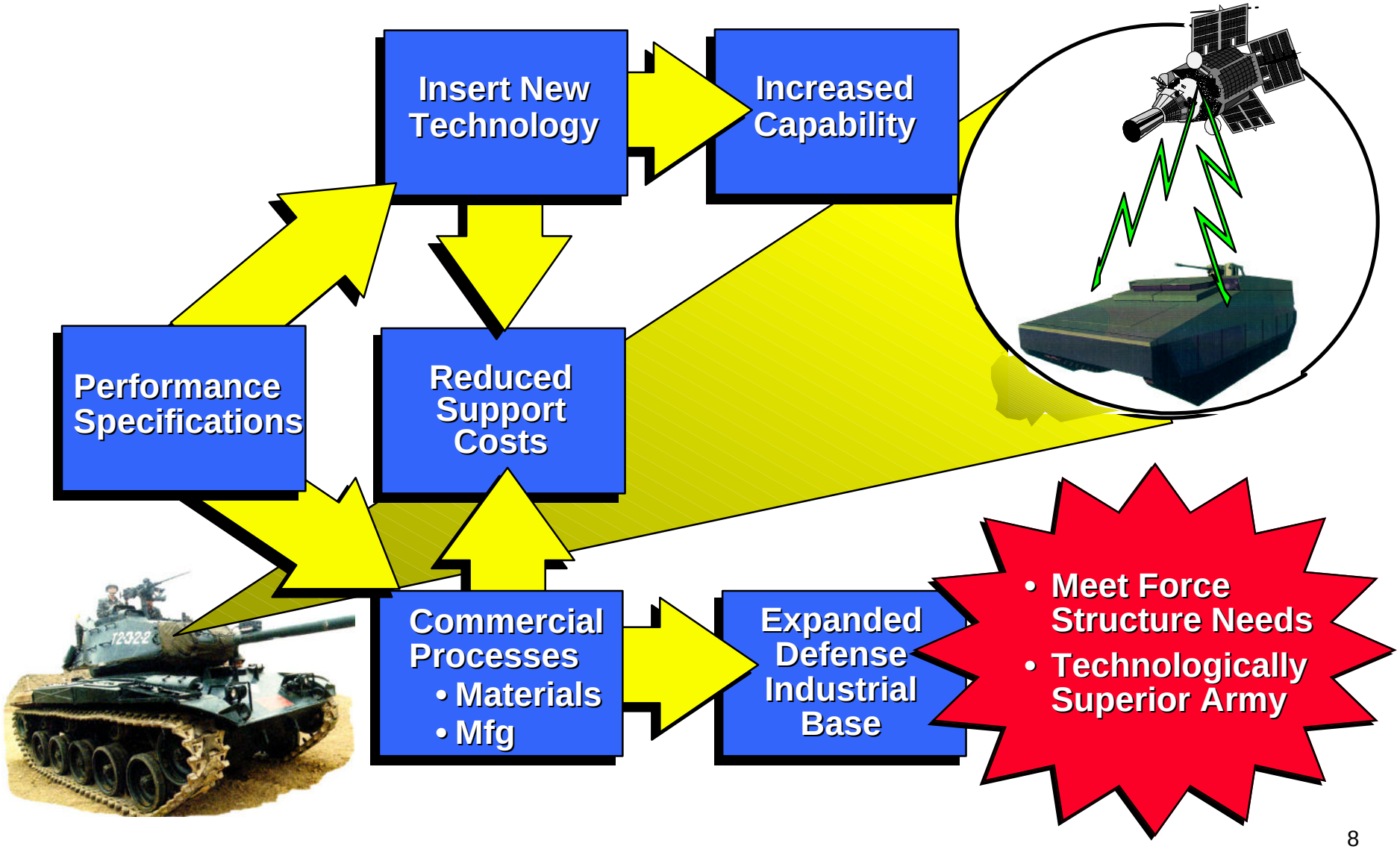
✓ ***Performance Outcomes NOT Design Details***

✓ ***Processes NOT Products***

✓ ***What NOT How***

Form, Fit, Function, Interfaces

The Modernization Process



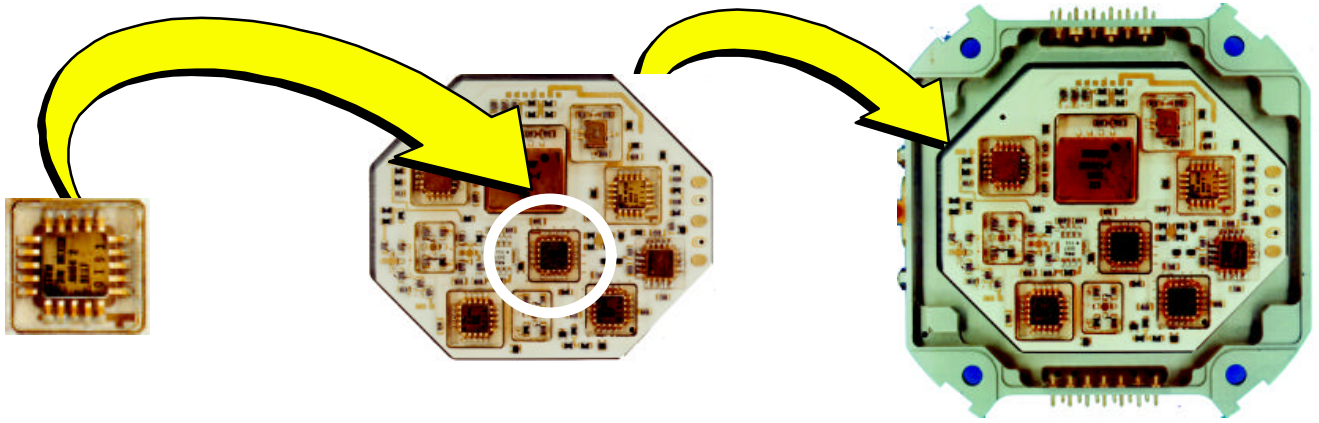
Current Procurement Emphasis

Rebuys and Spares Procurements

- **Progress in use of Performance Based Procurements**
  - **— First: Focus on ACAT Is & IIs**
  - **— Second: Focus on ACAT IIIs & IVs**
- **Current Focus: Reprocurements/spares**
- **Army took lead - applied reform to reprocurements**
- **Many procurements still use Detail Design Package**
- **Limits modernization of parts/ components/subsystems**

Performance Based Conversions

- **Modernization thru Spares Continuum:**



One-for-one replacement of piece part → **Aggregate to subassembly** → **Aggregate subsystem**

- **Requires:**
  - — **Revisiting configuration management levels**
  - — **Revisiting maintenance concepts**
  - — **CLS considerations**
  - — **Case-by-case business decision**

MTS Challenge to Acquisition Strategies

- Acquisition Initiatives / Incentives
- Commercialization
- Technology Insertion (TI)
- VE / SMA-OSCR / Depot Maintenance Reliability Program
- Parts Obsolescence / DMSMS
- Sustainment Strategy
- Standards & Spec Reform
- TDP Strategies
- Design Criteria/Systems Engineering
- Cost as an Independent Variable (CAIV)

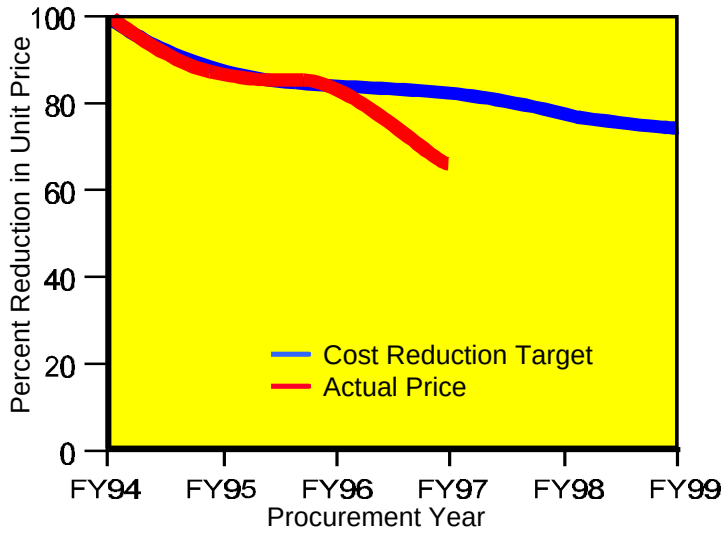
Acquisition Initiatives / Incentives

✓ *Using acquisition inititives as incentives to achieve MTS objective*

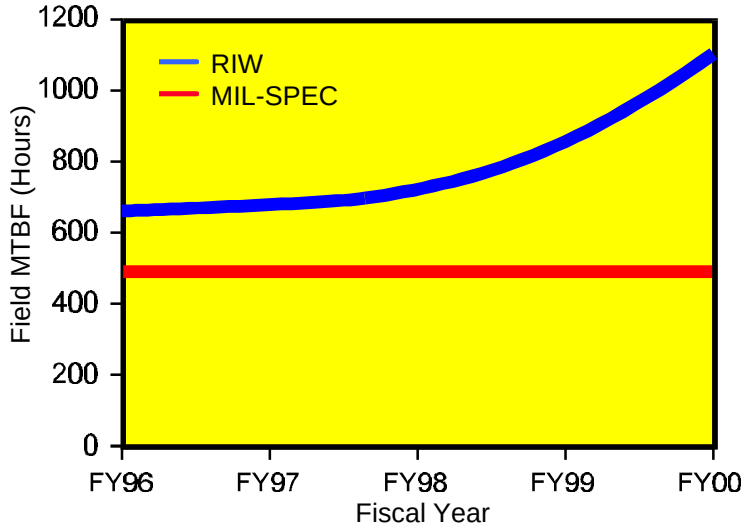
- **Develop performance based solicitations for spares**
- **Review RFP and contract clauses that encourage alternative proposals**
- **Consider privatization of weapon system - "Breakback"**
- **Explore bundling similar spares into single procurements**
- **Consider acquisition strategy best practices**
  - **Contractors retain design responsibility**
  - **Contractor logistics support**
  - **Shared cost savings**

Cost Reduction Initiatives
AN/ARC-210 V/UHF Communications System

Planned vs Actual Unit Price Reduction
(FY94 Unit Price = 100%)



Reliability Growth
MIL-SPEC vs ARC-210 RIW



- **Significant unit acquisition cost reduction**
- **Significant Life Cycle Cost reduction due to substantially improved MTBF and reduced spares requirements**
- **Contractor maintains configuration control below the top-level**
- **Contractor maintains the commercial repair depot**

✓ ***Significantly reduced cost without sacrificing product integrity!***

Commercialization

✓ *Gain insight and explore methods to emphasize the use of market research and acquisition of commercial items*

- **Develop processes to facilitate commercialization**
- **Explore methods to expand market research in spares/rebuys**
- **Identify barriers, environments, recommendations, processes and methodologies**

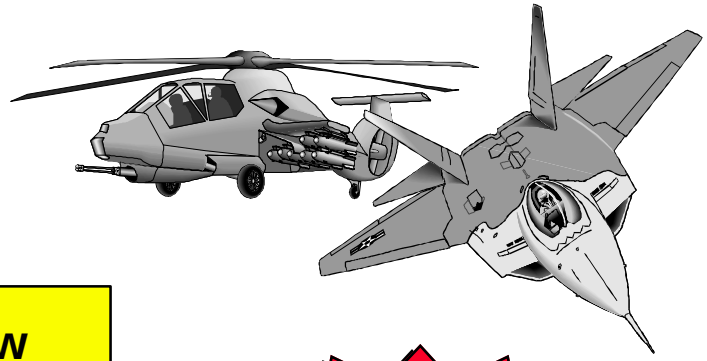
Commercialization

JSTARS-Commercial Processor Circuit Card

LRIP Savings: $1.2M

- **Technical Review**
- **Reliability Analysis**
- **Support Analysis**
- **Cost Comparison**

Commercial ICs



Savings: $50M

Challenge: **Apply Commercialization to MTS**

Technology Insertion (TI)

✓ *Performance based procurement offers TI opportunities*

- **Develop methods to identify opportunities for horizontal technology integration:**
  - **across many end item rebuys**
  - **high value or high quantity spares procurements**
- **Develop methods to identify opportunities for vertical insertion using higher assemblies**

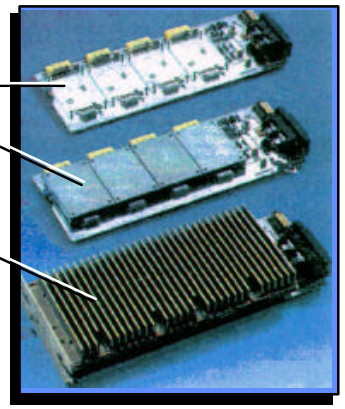
Horizontal Technology Integration

PAC--2 LVPS with High Density Module Technology

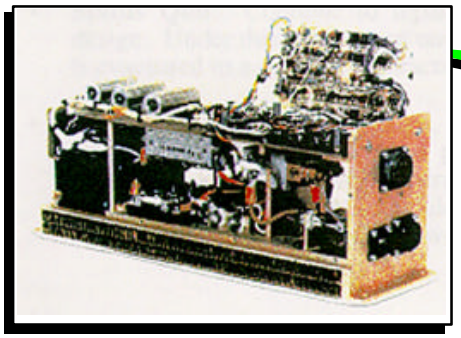
High density module (commercial off-the-shelf plug-in component)

New LVPS Concept

- Motherboard
- Motherboard with HDMs
- Low voltage power supply with Heat Dissipater



Old LVPS Concept



- High maintenance
- Outdated technology

- Higher reliability
- "Fix Forward" maintenance concept
- Less power consumption
- Standard modules for flexible configuration
- Incorporates state-of-the-art design "across-the-force"

VE / OSCR / PBD 714

✓ *VE/OSCR/PBD 714 provide mechanisms for MTS implementation*

- **Identify MTS relationship to VE/SMA-OSCR/ PBD 714 programs**
- **Emphasize top-down, system-wide review <u>versus</u> narrow look at an individual part / component**
- **Apply MTS concept to "Depot Maintenance Reliability Program" (PBD 714)**
  - **improve system life cycle cost**
  - **decrease initial investment**

Abrams Track System Improvement Program

- **Existing System: Track and Roadwheels**
  - **Rubber primary failure mode**
  - **One piece track (T156) life - 736 miles**
  - **Replaceable pad track (T158) life - 2200 miles**
  - **Roadwheel life - 1400 miles**
- **Potential New Track Design**
  - **Reduce/eliminate rubber at roadwheel/track interface**
  - **Retain ground pad for paved surface operation**
  - **Consider alternative materials/sources**
  - **Incorporate by planned issue of spares**

Parts Obsolescence / DMSMS*

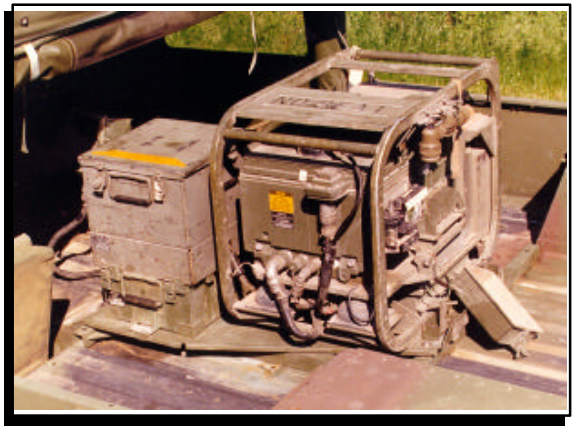
✓ *System design changes due to obsolesence and DMSMS offers modernization opportunities*

- **Obsolesence is prevalent in all life cycle phases**
- **Explore obsolesence mitigation techniques (open architecture, other flexible design techniques) during weapon system upgrades and changes**
- **Consider how obsolesence redesigns can complement MTS**
- **Consider methods for dealing with decreasing manufacturing sources**

*Diminishing Manufacturing Sources and Material Shortages.

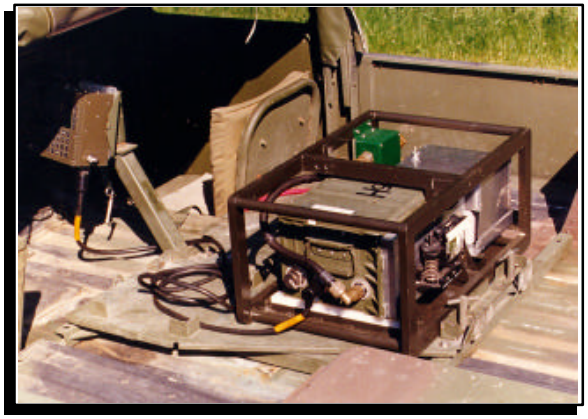
PADS* Replacement

PADS



- **Current System: AN/USQ-70**
  - **Aging system**
  - **Repair costs increasing**
  - **Obsolete technology**
  - **Not in production**

PADS Replacement



- **Proposed System: MAPS** Dynamic Reference Unit Hybrid, Control and Display Unit, Power Control Unit**
  - **Uses common elements fielded on Paladin and FIREFINDER radars**
  - **Accuracy exceeds requirement**
  - **Order of magnitude MTBF improvement (10,000 hours vs 250 hours)**
  - **Less field maintenance**
  - **Provides significant cost savings**

* PADS - Position and Azimuth Determining System
** MAPS - Modular Azimuth Position System

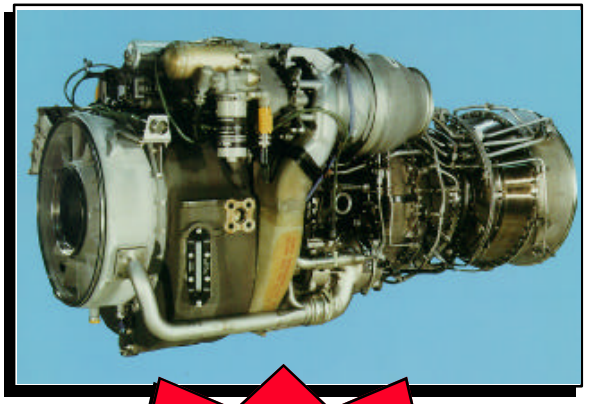
Sustainment Strategy

✓ *Logistics process changes can reduce life cycle costs and meet modernization objectives*

- **Identify sustainment considerations potentially affected by MTS**
  - **Provisioning levels**
  - **Existing supply inventory**
  - **Maintenance policy / planning**
  - **Contractor logistics support**
  - **Configuration management**
- **Consider PM role in MTS implementation**
- **Explore potential O&S cost savings**

CH-47D Engine Upgrade

- "Buy Back" lost performance for Army heavy lift capability
- 712 Modification ⇨ 714A
  - Incorporates Full Authority Digital Electronic Fuel Control
  - Replaces magnesium parts with aluminum/ stainless steel (reduced engine corrosion)
- 1150 engines to be converted
- Airframe modification required
- "New" engine warranty - 2400 hours (time between overhauls)
- CAIV principles applied ⇨ low risk



Savings:
$0.2M
per engine

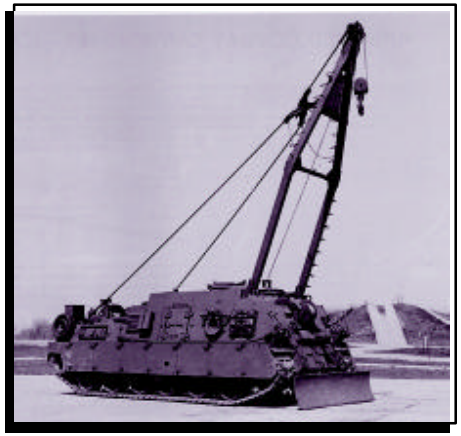
Standards & Specs Reform

✓ *Performance based specifications provide roadmap for modernization*

- **Examine the processes used for the conversion of detailed specifications to MIL-PRFs and their relationship to MTS**
- **Identify methods to arrive at optimum configuration management and provisioning levels considering MTS**
- **Identify impacts to “requirements flow down” from system to subassembly levels**
- **Identify changes to government/contractor risk relationships and risk management approaches**

Hercules Track Traction Improvement

- **Innovative design to improve tow capability in degraded soil conditions**
  - **Focus on switching from an integral pad to a replaceable pad track**
  - **Traction enhancement expected through integration of metal cleats on track**
- **Characteristics:**
  - **Replace track pads with 2-inch cleat**
  - **Space cleats at specific intervals on track**
  - **Consider torsion system changes**
  - **Consider rear lock-out changes**
  - **Investigate ideal position of towing pintle**
- **Incorporate capability using existing "O" Level Team**
- **Traction modernization possible through spares and attrition**



TDP Strategies

✓ *Use of detailed data packages limit modernization opportuniites*

- **Rebuys and spares procurements should use performance-based solicitations**
  - **Use Detailed Design Packages to define form, fit, function and interface requirements**
- **Explore impacts and solutions for MIL SPEC conversion regarding:**
  - **Re-engineering**
  - **Requalification**
  - **Adjustment to logistics program**
- **Consider use of conversion modeling tools to assist decision making**

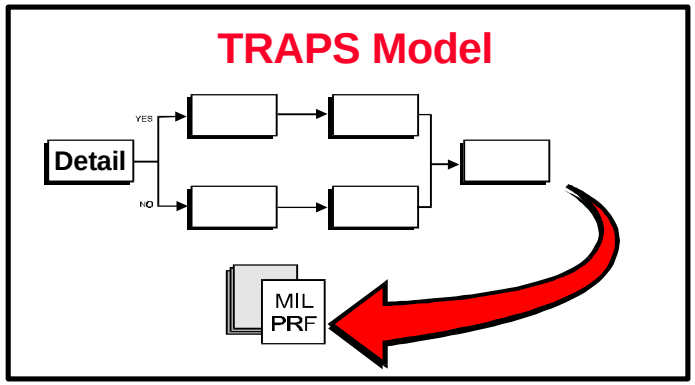
TDP Strategies

Anti-Tank Weapon Systems
TOW-ITAS/IBAS

- EMD Program Phase
- LORA = 138 Spare Items
- Spares procurements use

Performance Specs

TDP Conversion Model



- Analyzes detailed design packages
- Considers 22 functional support templates
- Calculates:
  - Projected savings
  - Break-even point
  - Technical risk

Good Business Decisions

Design Criteria/Systems Engineering

✓ *Effective design criteria will promote transfer of future technology into weapon systems*

- **Develop processes to incorporate MTS concepts in System Design processes**
  - **Open system architecture concepts**
  - **Systems engineering process elements**
- **Identify specification and statement of work provisions which:**
  - **Facilitate design modernization**
  - **Require consideration of MTS with logistics support analysis**
- **Identify methods to incorporate open systems architecture in MTS efforts**

Design Criteria/Systems Engineering

- **Examples of Potential Applications**
  - **Reprogrammable missile electronics**
    - **Continue advancements in Autonomous Target Recognition**
    - **Imlement “new” algorithms in “old” missiles**
  - **Modular missile**
    - **Provide low cost upgrade to “wooden” rounds**
    - **In future, design for modular replacement**
      - **warhead / safe and arm / fuze**
      - **sensor / seeker**
      - **G&C / missile electronics**
      - **propulsion unit**
  - **Payoff**
    - **Improved performance at reduced cost**
    - **Fewer “old” missiles, ie, extended service life**

Cost as an Independent Variable (CAIV)

✓ *Cost and performance tradeoffs can reduce risk and enhance modernization*

- **Consider CAIV in selecting MTS candidates**
- **Explore use of IPTs to plan and execute cost-performance- schedule trade-offs**
- **Use of ownership simulation model can aid identification and selection of MTS candidates**
- **Review potential application of CAIV to aggregating spares buys at higher system levels**

Cost as an Independent Variable (CAIV)

AN/ALQ-115(V) 2 Quickfix

- Quickfix system is not supportable due to obsolescence (Integrated Inertial Navigation System)
- Cost Analysis:

Investment	Quickfix Savings	Advanced Quickfix Cost Avoidance
$4.7 M	$17.0 M	$6.3 M

- Performance Analysis:
  - New Technology
  - Supportable
- Advanced Quickfix will replace Quickfix

Modernization by Mod Kit and Spares

Summary

- **Modernization of Army Weapon Systems is essential . . .**
  - **Reduced procurement budgets**
  - **Aging weapon systems**
- **Modernization can be achieved by leveraging the O & S spares expenditures**
- **Numerous acquisition processes can contribute to achieving the modernization through spares objectives**

Business Considerations

Modernization Through Spares